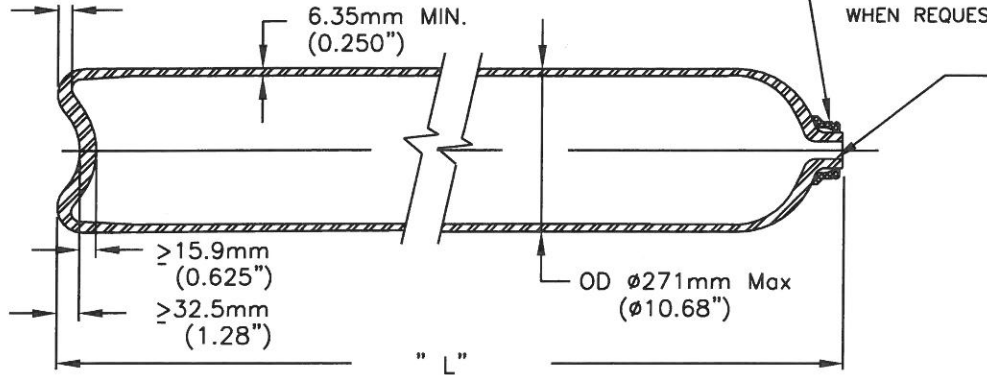


DRAWING FOR REFERENCE ONLY

≥15.9mm
(0.625")



Ø3 1/8" x 11 T.P.I.
OR COMPARABLE
WHEN REQUESTED

3/4- 14 NGT (10BC100P-3), 2.5-12UN-2B (10BC100P-2),
25E (10BC100P-25E), 1"-11 1/2 NGT (10BC100P-1),
OR COMPARABLE

| REV. | ECN - DESCIP. | DATE | DRWN. | CHKD. | APP. |
|------|---------------------|----------|-------|-------|------|
| 01 | THREADS - 2883 | 07/16/09 | JJM | SAM | |
| 02 | 2" UNS thread -2919 | 11/19/09 | JJM | | |

6(b). DOT 3AA CALCULATIONS:

The DOT formula can be written as:

$$t = 0.5 \times OD \times \left(1 - \sqrt{\frac{S - 1.3 Ph}{S + 0.4 Ph}} \right)$$

Where:

S = design stress; the lower of 0.67xRg or 70ksi (483 MPa)

$$0.67 \times Rg = 0.67 \times 112.4 = 75.3 \text{ ksi}$$

(use S = 70 ksi)

$$t = 0.5 \times 10.68 \times \left(1 - \sqrt{\frac{70000 - 1.3 \times 3834}{70000 + 0.4 \times 3834}} \right)$$

$$= 0.249" \text{ (6.33mm) - DOT calculated Min.}$$

*For Dual ISO/DOT design t min = 6.35mm (0.250")

SPECIFICATION: ISO 9809/1: 1999
DOT 3AA 2300

1. Service Conditions:

- DOT rated service pressure: 158 bar (2300 psi)
- ISO rated working pressure: 176 bar (2553 psi)
- Hydraulic test pressure: 264 bar (3834 psi.)

2. Material:

Cr-Mo-Steel, Fully killed and made to fine grain practice by basic oxygen or electric furnace process

Chemical Composition (%)

| | C | Si | Mn | P | S | Cr | Mo |
|------|------|------|------|-------|-------|------|------|
| Min. | 0.28 | 0.15 | 0.40 | -- | -- | 0.80 | 0.15 |
| Max. | 0.33 | 0.30 | 0.60 | 0.020 | 0.020 | 1.10 | 0.25 |

Note: S+P < 0.030

3. Manufacture:

Hot billet extrusion followed by hot drawing

4. Heat Treatment: Quenched and Tempered

- Austenitize: ~899°C (1650°F)
- Quenchant: Water based polymer: ~15% conc. (temperature ≤ 60°C(140°F))
- Temper: ~649°C(1200°F) (Min. 30 minutes at temp.)

5. Mechanical Properties: (at room temperature)

- Tensile (Rg): 775 - 930 MPa (112.4 - 134.8 ksi)
- Yield (Re): ≥ 658 MPa (95.4 ksi)
- Elong (A): ≥ 14% (ON $5.65 \sqrt{S_0}$)
≥ 20% on 2" G.L. for DOT
- Hardness: 225-270 BHN
- Flattening test: Flatten to Ø6 x t without cracks
- Charpy test (-50°C, Trans): ≥ 35 J/cm² (avg.)
- UT flaw detection: Each cyld. per ISO 9809-1
- Batch burst test: Pb ≥ 423 bar (6135psi)

6(a). Thickness Calculations: (ISO 9809/1: 1999)

$$a = 0.5 \times D \left(1 - \sqrt{\frac{10FRe - \sqrt{3} Ph}{10FRe}} \right)$$

Where:

Ph = Test Pressure (bar) = 264 bar (3834psi)

D = External diameter of container = Ø271 mm Max

F = Lesser of 0.65/(Re/Rg) or 0.85; Re/Rg ≤ 0.9

= Lesser of 0.65/0.85 or 0.85 = 0.765 (for Re/Rg = 0.85)

$$a = 0.5 \times 271 \left(1 - \sqrt{\frac{(10 \times 0.765 \times 658 - \sqrt{3} \times 264)}{10 \times 0.765 \times 658}} \right) = 6.3 \text{ mm (0.248")}$$

NOTE: a', the guaranteed min thickness = 6.35mm (0.250") exceeds calculated min thickness, a.

| MODEL | LENGTH 'L' | | Min WATER CAPACITY | | APPROX. WGT. W/O FITTINGS | |
|----------|------------|------|--------------------|-----------------|---------------------------|-----|
| | MM | IN | LITERS | IN ³ | KG | LBS |
| 10BC100P | 1473 | 58 | 66.7 | 4079 | 85 | 187 |
| *Vmin | 815 | 32.1 | 33.7 | 2055 | 50 | 110 |
| *Vmax | 2208 | 86.9 | 104.5 | 6375 | 120 | 265 |

*Note: Model 10BC100P is the design qualification test cylinder. Vmin and Vmax represent the range covered by the same design family.



NORRIS CYLINDER COMPANY

4818 WEST LOOP 281 LONGVIEW, TEXAS 75603 USA

REFILLABLE SEAMLESS STEEL
CYLINDER FOR CARBON-DIOXIDE AND
RELATED MIXTURES

| SCALE | NOT TO SCALE | | DRAWING NO. | | REV. |
|----------|--------------|---------|-------------|--|-------------|
| DWN. BY | R.S. | 6/14/04 | 901A-A-9647 | | 02 |
| CHK'D BY | | | SHEET NO. 1 | | OF 1 SHEETS |
| APP'D BY | | | | | |